

## CLAIMS

1. An imaging system comprising:  
first means mounted on a mobile platform for receiving a beam of electromagnetic energy;  
second means for recording an image provided by said beam; and  
5 third means for compensating said image for motion of said platform relative to an external reference.
2. The invention of Claim 2 wherein said second means includes means for digitally storing a holographic image.
3. The invention of Claim 2 wherein said holographic image is an interference pattern.
4. The invention of Claim 2 wherein said second means is a camera.
5. The invention of Claim 2 wherein said second means is a one-dimensional detector array.
6. The invention of Claim 2 wherein said second means is a two-dimensional detector array.
7. The invention of Claim 4 further including means for reading said holographic interference pattern.
8. The invention of Claim 7 wherein said means for reading said pattern includes means for performing a time delay integration.

9. The invention of Claim 2 further including means for transmitting a beam from said platform to said target.

10. An imaging system comprising:

first means mounted on a moving platform for receiving a beam of electromagnetic energy at physical aperture of said imaging system;

second means for recording an intensity and phase pattern provided by said  
5 beam; and

third means mounted on said platform for redirecting said beam to said means for recording whereby the instantaneous location of said beam on said recording medium is controlled to compensate for motion of said platform relative to an external reference over a predetermined time interval..

11. The invention of Claim 10 wherein said intensity and phase pattern is a holographic interference pattern.

12. The invention of Claim 11 further including means for transmitting a beam from said platform to said target.

13. The invention of Claim 12 wherein said first means includes a laser.

14. The invention of Claim 12 wherein said received beam is a reflection of said transmitted beam from said target.

15. The invention of Claim 14 further including means for providing a reference beam.

16. The invention of Claim 15 further including means for causing said reference beam and said received beam to interfere at an optically relayed aperture plane and thereby provide said holographic interference pattern.

17. The invention of Claim 16 further including means for controlling the phase of said reference beam relative to said received beam.

18. The invention of Claim 17 further including means for controlling the phase of said reference beam relative to said received beam to compensate for nonlinear motion of said platform during a predetermined time interval.

19. The invention of Claim 11 further including means for reading said holographic interference pattern.

20. The invention of Claim 10 wherein the first means is a focusing lens.

21. The invention of Claim 10 wherein said second means is a recording medium.

22. The invention of Claim 21 wherein said recording medium is a holographic recording medium.

23. The invention of Claim 22 wherein said holographic recording medium is re-recordable.

24. The invention of Claim 10 wherein said third means includes a scan mirror.

25. The invention of Claim 24 wherein said third means includes means for controlling said scan mirror.

26. The invention of Claim 25 wherein said means for controlling includes a controller and said third means includes means for providing platform velocity information to said controller.

27. The invention of Claim 26 wherein said means for controlling further includes means for providing sensor line of sight information.

28. The invention of Claim 27 wherein said means for controlling includes means for compensating for target motion.

29. The invention of Claim 28 further including means for continuously recording a relayed image of an aperture plane of said system.

30. A holographic synthetic aperture ladar system comprising:  
a laser, mounted on a mobile platform and adapted to output a beam of coherent energy;  
an optical arrangement mounted on said platform for directing said beam to a  
5 target and receiving a reflection therefrom;  
a scan mirror in optical alignment with said optical arrangement;  
a holographic optical storage medium; and  
a controller for directing said scan mirror to adjust a position of said reflection on said medium in response to motion of said platform relative to said target.

31. An imaging method comprising the steps of:  
receiving a beam of electromagnetic energy on a moving platform;  
recording an image provided by said beam; and  
compensating said recorded image for motion of said platform relative to an external reference.